

Figure 1

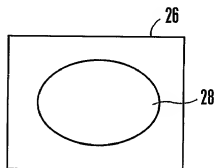


Figure 2

$$p(d|O) = p(d) \frac{p(O|d)}{p(O)} \quad (1)$$

$$p(d|o_1, \dots, o_M) = p(d) \frac{p(o_1, \dots, o_M|d)}{p(o_1, \dots, o_M)}, \quad (2)$$

$$p(o_1, \dots, o_M|d) = \prod_{i=1}^M p(o_i|d). \quad (3)$$

$$p(d|o_1, \dots, o_M) = p(d) \frac{\prod_{i=1}^M p(o_i|d)}{p(o_1, \dots, o_M)}. \quad (4)$$

$$p(d|o_1, \dots, o_M) \propto p(d) \prod_{i=1}^M p(o_i|d) \quad (5)$$

$$\log p(d|o_1, \dots, o_M) \propto \log p(d) + \sum_{i=1}^M \log p(o_i|d) \quad (6)$$

$$p(o_1, \dots, o_M) = \prod_{i=1}^M p(o_i) \quad (7)$$

$$p(d|o_1, \dots, o_M) = p(d) \frac{\prod_{i=1}^M p(o_i|d)}{\prod_{i=1}^M p(o_i)} = p(d) \prod_{i=1}^M \frac{p(o_i|d)}{p(o_i)} \quad (8)$$

$$M_{x,y} = \log \frac{p(x|y)}{p(x)} = \log \frac{p(y|x)}{p(y)} = \log \frac{p(x,y)}{p(x)p(y)}. \quad (9)$$

$$\log p(d|o_1, \dots, o_M) = B_d + \sum_{i=1}^M M_{o_i, d} \quad (10)$$

Figure 3A

$$p(y) = \frac{c_y}{N} \quad (11)$$

$$p(x,y) = \frac{c_{x,y}}{N} \quad (12)$$

$$p(y|x) = \frac{c_{x,y}}{c_x} \quad (13)$$

$$\frac{p(y|x)}{p(y)} = \frac{c_{x,y}N}{c_x c_y} \quad (14)$$

$$p(y) = \frac{c_y+1}{N+U} \quad (15)$$

$$p(x,y) = \frac{c_{x,y}+1}{N+U} \quad (16)$$

$$p(y|x) = \frac{c_{x,y}+1}{c_x+1} \quad (17)$$

$$\frac{p(y|x)}{p(y)} = \frac{(c_{x,y}+1)(N+U)}{(c_x+1)(c_y+1)} \quad (18)$$

Figure 3B

Fig. 4

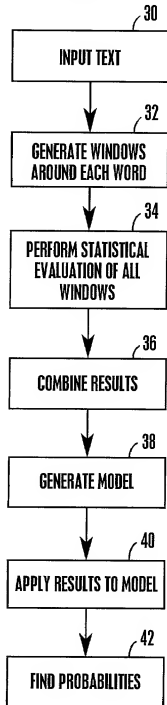


Fig. 5

Document 1: the quick brown fox slyly
 Document 2: jumped over the lazy dog

Fig. 6

	Document Center word	Window
1	the	the quick
1	quick	the brown fox
1	brown	the quick fox slyly
1	fox	quick brown slyly
1	slyly	brown fox
2	jumped	over the
2	over	jumped the lazy
2	the	jumped over lazy dog
2	lazy	over the dog
2	dog	the lazy

Fig. 7

Single counters:

1	5
2	5
the	7
quick	3
brown	3
fox	3
slyly	2
jumped	2
over	3
lazy	3
dog	2

Fig. 8

Pairs:

1-the	3
1-quick	3
1-brown	3
1-fox	3
1-slyly	2
2-over	3
2-the	4
2-jumped	2
2-lazy	3
2-dog	2

Total 28 (this is variable N)